

REMARKS

The specification has been amended simply to assign a name to the procedure used for testing the porosity (microporosity) of a pre-coated mat as described in paragraph [66] of the specification so that this procedure could be referenced in a shorthand manner in the claims. Claims 6 and 7 have been amended to recite ranges for microporosity described in the application (paragraph [66]). No new matter is added by these changes.

Claims 13, 15 and 17 have been amended to provide an appropriate antecedent basis for the subject matter originally embraced by the claims. In particular, claim 13 has been amended to recite the water resistant additive as a positive element of the set gypsum core. Support for the claimed subject matter is found, *inter alia*, in paragraphs [70] to [72] and in original claim 13. Claim 15 has been amended simply to recite the proper antecedent term. Claim 17 has been amended to clarify the existence of the second (“another”) mat. Support for this amendment is found, for example in paragraph [86]. No new matter has been added.

Claims 1-15, 18 and 19 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Randall et al. (U.S. 2002/0155282) in view of Ali (U.S. 4,647,486). This rejection is respectfully traversed.

As acknowledged in the Office Action, the Randall 2002/0155282 published application (hereinafter Randall) does not disclose the percentage that the mat coating extends into the fibrous mat. The pending claims specifically require that the coating extend into said fiber mat a distance between about 30 and 50 percent of the thickness of the mat. That structural detail is nowhere described or suggested in Randall. While Randall describes a set of conditions of mat

thicknesses, coating application rates and coating thicknesses that might on occasion provide the penetration percentage required by the pending claims, obtaining the claimed amount of penetration is NOT an inherent consequence of those parameters. Moreover, simply because the prior art might occasionally provide a structure that is required as one aspect of the claimed gypsum board is not enough to sustain an obviousness rejection based on that prior art. Here, Randall does not teach that the strength of the bond between the pre-coated mat facer and the core of the gypsum board, as measured by the bond tensile property using the procedure described in Example 3 of the pending application, is maximized by maintaining the coating penetration, in combination with the other recited properties, in the range of 30% to 50% of the mat thickness. See the results presented in Example 3 of the subject application. Absent such disclosure, Randall does not make the claimed invention obvious.

The Office Action also admits that Randall does not recognize the significance that gypsum core calcination in the vicinity of the coated mat facer has on gypsum board strength. The Office Action contends that a skilled worker would have applied this requirement to Randall in order to improve board fire barrier properties. It is for this reason that the Office Action relies on Ali, U.S. 4,647,486 (hereinafter Ali).

Ali describes a gypsum board having increased fire resistance. The focus of the Ali invention is the incorporation of calcium sulfate anhydrite, preferably in fibrous form, into the gypsum core of the board to obtain that increased resistance. The Office Action refers to the disclosure at column 1, lines 20-23 of Ali (BACKGROUND OF THE INVENTION). Here, the description merely states a known fact that gypsum (hydrated calcium sulfate or calcium sulfate

dihydrate -  $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ ) contains about 21% (actually 20.9%) by weight “chemically combined water” and that the “chemically combined water” contributes to the effectiveness of gypsum board products (as a general proposition) as a fire barrier. However, the level of calcination in the vicinity of the board surface is not a point of consideration in Ali.

In particular, Ali does not suggest that the exact stoichiometry of hydrated gypsum must be maintained across the entire cross-section of the commercially produced gypsum board either to maintain the desired structural properties of the board or to maintain the effectiveness of the board as a fire barrier. Indeed, to the extent Ali uses calcium sulfate anhydrite II in the board, the absolute dihydrate stoichiometry is disturbed. That notwithstanding, however, maintaining the exact dihydrated relationship across the entire cross-section of any commercially produced gypsum board, particularly in the surface portion of the board, is difficult to do in practice because the final heating of the board in the drying oven, following initial hydration, tends to impact the board surfaces disproportionately to the board’s interior. Ali does not suggest any particular limit on such surface calcination that unavoidably accompanies commercial board drying operations.

The present invention thus is based on the determination by the inventors that to maximize the strength of the bond between a pre-coated mat and the gypsum core that several inter-related factors (as recited in the claims) must be properly maintained in balance. The prior art neither discloses nor suggests the importance of maintaining such inter-relationships for maximizing bond strength.

Claims 16 and 20 have been rejected under 35 U.S.C. 103(a) as being unpatentable over

Randall in view of Ali and further in view of Babcock et al., U.S. 4,746,365 (Babcock). Claim 17 has been rejected under 35 U.S.C. 103(a) as being unpatentable over Randall in view of Ali and Babcock and further in view of Miyakoshi, U.S. 5,837,788. These rejections are respectfully traversed.

These rejections depend on the sufficiency of the earlier rejection based on the combination of Randall and Ali. As discussed above, the combination of Randall with Ali does not make the invention defined by claim 1 obvious. Since claims 16, 17 and 20 all depend in one way or another on claim 1, these claims are patentable for the same reasons.

All claims stand rejected for obviousness-type double patenting over either (1) claims 1, 3-16 and 18-23 of copending application No. 10/417,344 (the '344 application) or (2) claims 1-20 of U.S. 6,808,793 (the '793 patent), both in view of Ali. These rejections are respectfully traversed.

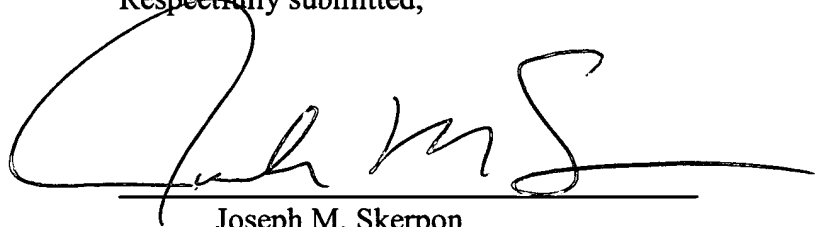
As regards these rejections, neither the '344 application, nor the '793 patent adds anything to what is presented by the statutory Randall and Ali combination concerning the inter-related factors recited in the claims that must be properly maintained in balance to obtain the strength improvement of the present invention. These combinations fail to sustain the case for obviousness for the same reasons.

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U.S. Patent Application Serial No. 10/798,891

Atty. Docket 006242.00043  
(8605/US)

On the basis of the above, the claims stand in condition for allowance. The allowance of the claims is thus respectfully requested.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'JMS', is written over a horizontal line.

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Date: March 1, 2006

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